

Remarks

The examination states that the term "filtering the continuous phase modulated signal in claim 1, 5, and 11 is misdescriptive", and states that "Rather, it [is] the demodulated signal (baseband signal) which is filtered rather than the received signal. When an input signal (such as the continuous phase modulated signal) is up converted prior to transmission and equally down converted upon reception, the output signal is equal to the input signal. The continuous phase modulated signal is a component signal of the transmitted signal. That is, the continuous phase modulated signal is communicated. The continuous phase modulated signal as in claim 1, 5, and 11 is present upon transmission and upon reception, and is NOT limited to conventional up conversion and down conversion processes. Baseband is a characteristic of a low frequency operation typically used in connection with up and down conversion in the IF and RF domains. The continuous phase modulated signal is referred to as being at baseband in connection with the up and down conversion in claim 3. This is very well known prior art, and is not indefinite or misdescriptive as the examination suggests.

The examination states that the newly added limitation "is up converted from baseband during transmitting step in claims reads as if the claimed invention is RF which requires further search", as a justification to finally reject. It is difficult to appreciate how trivial up and down conversion, that is very well known in the prior art, could possibly inject into this case as this late stage, a need to perform an additional search. Ho is the closest prior art having similarly named functions (precoding, demodulation, and

1 filtering) in similar structure locations, though performing
2 totally different functions for achieving completely different
3 results. It is not known why this case was finally rejected, when
4 the closest prior art has been cited and properly addressed by
5 applicant with clear reasons for allowance, pointing out the
6 examination's failure to fully understand the cited reference in
7 view of the claimed invention. Notwithstanding, this traverse,
8 applicant requests a continuing examination.

9

10 Claim 4 was rejected as indefinite. Applicant requests
11 reconsideration. The claim has been accordingly amended.

12

13 Claim 1 and 2 were rejected as anticipated Ho. Claims 3, 4, 5,
14 8, 9, 10, 11, 19, and 20 were rejected as unpatentable over Ho in
15 view of prior art. Claims 6, 7, and 12-18 were objected to as
16 having allowable subject matter based rejected base claims.
17 Applicant requests reconsideration.

18

19 It is apparent that the examination has confused claimed
20 features with features found in Ho. To aid the examination in
21 realizing the patentable differences, the old term "decoding" in
22 the independent claims has been replaced with "demodulating", and
23 old "demodulating" term in the claims has been deleted, so that the
24 examination does not continue to confuse unrelated elements of the
25 invention and that of Ho.

26

27 The original claim 1 uses the term "demodulating" to reference
28 the downconversion process that occurs when demodulating a carrier

1 upon reception. In the transmitter, the phase-modulated signal is
2 upconverted from a baseband frequency to a high RF frequency for
3 efficient transmission. The transmitted signal is then
4 downconverted during reception from the high RF frequency back down
5 to the baseband frequency. This up and down conversion is very well
6 known art. The reference to the baseband signal now only appears in
7 dependent claim 3 along with the reference to up conversion and
8 down conversion. As such, claim 1 no longer uses the term
9 "demodulation".

10
11 The original claim 2 used the term decoding, as in Viterbi
12 decoding algorithms that are commonly used for "demodulating" a
13 sequence of sampled inputs from the filtered continuous phase
14 modulated signal. The primary reference, upon which the examiner
15 relies, uses the term "Viterbi demodulator", which is a specific
16 type of demodulator. Claim 2 and Ho now both use the term
17 "demodulator" for that function, so that, it is now hoped that a
18 proper one-to-one comparison can now be clearly understood by the
19 examiner, without confusion.

20
21 Claim 1 and 2 are considered together, as when combined, the
22 original data stream, that is a bit data stream, in the transmitter
23 is regenerated in the receiver as an estimate of the unprecoded
24 data symbols, thereby completing the communication from the
25 transmitter to the receiver. The bit data stream is processed in a
26 series of process steps as claimed in claims 1 and 2, and as now
27 compared, step by step with Ho, so as to remove the examination
28 confusion and miscomparisons.

1
2 The bit data stream is a series of binary digits of zeros and
3 ones. Both the present invention and Ho have an original bit data
4 stream, such as b_k as used in Ho. The bit data stream is symbolized
5 into a series of data symbols. In the case of NRZ 2-ary formatting,
6 for example, the series of 0 and 1 bits are formatted into a series
7 of +1 and -1 data symbols having a symbol set of +1 and -1, for 2-
8 ary modulation. For 4-ary modulation using NRZ mapping, two
9 consecutive bits of 0 and 1 are formatted into a data symbol having
10 the symbol set of +1, -1, +3, and -3. Hence, there is generated a
11 sequence of M-ary data symbols. The M-ary symbols are then precoded
12 in a particular and prescribed manner, as particularly stated in
13 the precoding tables stated in the specification. The precoded
14 symbol set is the same as in an unprecoded symbol set, that is, +1
15 and -1 for 2-ary modulation and +1, -1, +3 and -3 for 4-ary
16 modulation. Ho performs the encoding and precoding functions in the
17 "encoder", and Ho's c_k output is the precoder output. However, the
18 particular precoding selected in Ho is used specifically to inject
19 pilot symbols for channel estimation, and not to remove decoding
20 after demodulation as does the present invention. The encoded data
21 symbols c_k in Ho, along with the injected pilot symbols, are phase
22 modulated using a BT product and transmitted as such.
23

24 Upon reception, the present invention uses a phase amplitude
25 modulation (PAM) based filter bank to provide filtered signals
26 having components that directly indicates the unprecoded, that is,
27 the original data symbols. In contrast, Ho uses an anti-aliasing
28 filter to remove noise. The filter output in Ho does not have

1 signal component that directly indicate the unprecoded data symbols
2 b_k . There is no similarity in these two filtering functions because
3 the respective filters serve two different respective purposes.
4 Although both are referred to as filters, the actual filtering
5 performed and the purposes are clearly unrelated.

6
7 As such, the filter outputs in the present invention are of
8 significant value per se, in that, the filter outputs could be used
9 for directly generating an estimate of the unprecoded data symbols
10 using one of many forms of Viterbi demodulation with various levels
11 of complexity and resulting performance. With a sufficiently large
12 BT product, the output of a signal filter, for example, the
13 principal filter, can be used to directly provide reliable
14 estimates of the unprecoded data stream.

15
16 The filter output is sampled at the symbol time boundaries in
17 both Ho and the present invention. The demodulator in the present
18 invention DIRECTLY provides the estimated unprecoded symbols, that
19 is, the uncoded data symbols, whereas the demodulator in Ho only
20 provides an estimate of the encoded data symbols, which must then
21 be DECODED to arrive at the estimate of the uncoded data symbols.
22 As such, the examination must now recognize that Ho does not use a
23 precoder for eliminating the decoding step in the receiver, as does
24 the present invention. Clearly, the invention is directly contrary
25 to Ho's teachings. Ho does not address the very problem that the
26 present invention solves. Ho cannot possibly use a precoder as in
27 the present invention to solve the problem of avoiding the final
28 decoding step in the receiver.

See also
the equivalents
What is it?

1
2 Ho does teach the use of a Viterbi demodulator, but such
3 demodulators have long been used. In the case of small BT products
4 and high-order M-ary modulation, Viterbi demodulation is often used
5 to mitigate the degrading effect of intersymbol interference, that
6 is typically shown in eye diagrams having poorly defined detection
7 levels in the constellation signal space. However, and as an
8 example, in the case of 2-ary communications with a relatively
9 large BT product and where the output of the principal filter is
10 sampled at symbol boundaries, a simple comparison of the sampled
11 principal filter outputs to a zero threshold value could be used as
12 a demodulator of the unprecoded data symbols. That is, the
13 demodulator could be a simple thresholding device. The choice of
14 demodulator addresses the selected BT value and system BER
15 performance in the presence of channel noise, and is not
16 determinative as to the innovative structure and functions of the
17 invention. Hence, claim 1 does not specify the exact type of
18 demodulator used, as the focus of the invention is directed to the
19 use of a precoder for use with a corresponding filter providing a
20 phase indicating the unprecoded data symbol, so that, post-
21 demodulation decoding is not needed.

22

23 The present invention precodes data in a continuous phase
24 modulator in combination with and matched to a filter for providing
25 a filtered output having a phase that directly relates to the
26 unprecoded data, so as to avoid the need for decoding in the
27 receiver. Ho's use of precoding for injecting pilot symbols is
28 irrelevant. Ho's use of an anti-aliasing filter is irrelevant, as

1 well. But, Ho is a good prior art example of demonstrating the need
2 for decoding in the receiver after demodulation, as Ho never
3 addresses the problem of eliminating this decoding, as Ho teaches
4 that this decoding "undoes" the encoding that was done in the
5 modulator, and Ho specifically teaches that "The output of the
6 demodulator 18, is sent to a decoder 20, which undoes the mapping
7 done by the encoder 10." The object of the precoding in the present
8 invention is to remove the need for decoding after the demodulator,
9 and as such, the present invention proceeds directly contrary to
10 Ho, as Ho is strong evidence of nonobviousness.

11

12 The cited references do not teach precoding in a continuous
13 phase modulator for recovering from a matched filter a data stream,
14 without post demodulation decoding. Allowance of the claims is
15 requested.

16

17 Respectfully Submitted

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19 Derrick Michael Reid

20

21 CERTIFICATE OF MAILING

22 I, hereby certify that this correspondence is being deposited
23 in the United States Postal Service in an envelope with First Class
24 full postal prepaid thereon addressed to: Commissioner of Patent,
25 P.O. Box 1450 Alexandria, VA 22313-1450.

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